

**Lexical Analysis - AMD.L.I-3 TEST**  
**Theory of Automata and Discrete Mathematics**  
**School of Computer Science**  
**University of Oviedo**  
**07-03-2023**

Download LA\_G3.zip and unzip it.  
Edit the file `examSpec.lex` to do the following exercises:

### 1. Exercise 1 (3 points)

Add two new rules for an operator and a reserved word as follows as follows:

- Increment. The operator code will be `++` and the output message should be  
`SCANNER:: found Operator INCREMENT`
- Struct. The reserved word to match will be `struct` and the output message should be  
`SCANNER:: found Reserved Word STRUCT`

### 2. Exercise 2 (3.5 points)

Write a new rule so your scanner recognizes exam codes. An exam code consists of 2 sections separated by a hyphen (-). The first section consists of a lowercase letter in {a, b, c}, followed by an even number of digits. The second section consists of a sequence of 1 or more letters (lowercase or uppercase) that ends in M, followed by 1 or 2 digits. The output message should be `SCANNER:: found EXAM CODE (the exam code)`  
Correct examples: a-M1, a45-tDrhM22, b8548-MMM2, c-abcM99  
Incorrect examples: a--M1, g45-tDrhM22, b8548-MMMa2, c-abcM998

### 3. Exercise 3 (3.5 points)

Write a new rule so your scanner recognizes sets of exam codes. A set of exam codes consists of a sequence of 1 or more exam codes separated by commas (,) and enclosed in curly brackets ({}). Note that **the empty set ({} is not allowed**, and there cannot be empty spaces in the set. The output message should be `SCANNER:: found SET OF EXAM CODES (the set of exam codes)`  
Correct examples: {a-M1}, {a-M1,a45-tDrhM22,b8548-MMM2}, {a-M1,b8548-MMM2}, {a-M1,a-M1,a-M1,a-M1}  
Incorrect examples: {a}, {a-M1 a-M1,a-M1, {}}, [a-M1,b8548-MMM2]

You can test you scanner generating it with the command `generateScanner.bat` and running it with the file `test_exam` as input with the command `java -classpath ; Ylex test_exam`

When done, upload your file `examSpec.lex` to the task in Campus Virtual.

## Expected output

```
SCANNER:: found Operator INCREMENT
SCANNER:: found Reserved Word STRUCT
SCANNER:: found EXAM CODE (a-M1)
SCANNER:: found EXAM CODE (a45-tDrhM22)
SCANNER:: found EXAM CODE (b8548-MMM2)
SCANNER:: found EXAM CODE (c-abcM99)
SCANNER:: LEXICAL ERROR (a--M1)
SCANNER:: LEXICAL ERROR (g45-tDrhM22)
SCANNER:: LEXICAL ERROR (b8548-MMMa2)
SCANNER:: LEXICAL ERROR (c-abcM998)
SCANNER:: found SET OF EXAM CODES ({a-M1})
SCANNER:: found SET OF EXAM CODES ({a-M1,a45-tDrhM22,b8548-MMM2})
SCANNER:: found SET OF EXAM CODES ({a-M1,b8548-MMM2})
SCANNER:: found SET OF EXAM CODES ({a-M1,a-M1,a-M1,a-M1})
SCANNER:: LEXICAL ERROR ({a})
SCANNER:: LEXICAL ERROR ({a-M1 a-M1,a-M1})
SCANNER:: LEXICAL ERROR ({})
SCANNER:: LEXICAL ERROR ([a-M1,b8548-MMM2])
```